Listing of the Claims:

1. (Previously presented) A steering control device for use in a vehicle having a steering wheel that receives steering input, and an electronically-controlled steering unit that turns the vehicle's wheels over a road surface based on the position of the steering wheel, comprising:

a reaction force device coupled to the steering wheel and responsive to a control signal to apply a steering reaction force to the steering wheel, a value of the control signal equal to a summation of a plurality of terms, the plurality of terms including at least a steering angle term $Kp*\theta$, a steering angle velocity term $Kd*d\theta/dt$ and a steering angle acceleration term $Kdd*d^2\theta/dt^2$; wherein θ is a steering angle of the steering wheel, Kp is a steering angle gain dependent on the steering angle such that the steering angle gain is non-zero when the steering angle is non-zero and dependent on vehicle speed such that an absolute value of the steering angle gain is higher at a first vehicle speed than at a second vehicle speed lower than the first vehicle speed, Kd is a steering angle velocity gain dependent on a steering angle velocity such that the steering angle velocity gain is non-zero when the steering angle velocity is non-zero and dependent on the vehicle speed such that an absolute value of the steering angle velocity gain is higher at the first vehicle speed than at the second vehicle speed, and Kdd is a steering angle acceleration gain dependent on a steering angle acceleration such that the steering angle acceleration gain is non-zero when the steering angle acceleration is non-zero and dependent on the vehicle speed such that an absolute value of the steering angle acceleration gain is higher at the first vehicle speed than at the second vehicle speed;

a hands-free sensor configured to generate a signal indicative of whether the steering wheel is in a hands-on state or a hands-off state; and

a controller configured to reduce the steering reaction force applied if the hands-off state is indicated relative to the steering reaction force applied if the hands-on state is indicated by using a value of at least one of a coefficient and a gain for at least one of the plurality of terms in the summation if the hands-off state is indicated that is different from a value used if the hands-on state is indicated.

2. (Previously presented) The steering control device of claim 1, further comprising:

a road surface reaction force sensor configured to generate a signal indicative of a road surface reaction force F, the plurality of terms including a road surface reaction force term D*Kf*F; and wherein the controller is configured to reduce the steering reaction force if the hands-off state is indicated by using the value of least one of a road surface reaction force coefficient D and a road surface reaction force gain Kf in the road surface reaction force term if the hands-off state is indicated that is different from the value used in the road surface reaction force term if the hands-on state is indicated; and wherein the road surface reaction force gain is dependent on the read surface reaction force such that the road surface reaction force gain is non-zero when the road surface reaction force is non-zero and dependent on vehicle speed such that an absolute value of the road surface reaction force gain is higher at the first vehicle speed than at the second vehicle speed.

3. (Previously presented) The steering control device of claim 1, further comprising:

a steering angle detection sensor configured to generate a signal indicative of the steering angle; and wherein the steering angle term comprises $A*Kp*\theta$ and the controller is configured to reduce the steering reaction force if the hands-off state is indicated by using the value of least one of a steering angle coefficient A based on a steering torque and the steering angle gain in the steering angle term if the hands-off state is indicated that is different from the value used in the steering angle term if the hands-on state is indicated.

4. (Previously presented) The steering control device of claim 1, further comprising:

a steering angle acceleration detection sensor configured to generate a signal indicative of the steering angle acceleration; and wherein the steering angle acceleration term comprises $C*Kdd*d^2\theta/dt^2$ and the controller is configured to reduce the steering reaction force if the hands-off state is indicated by using the value of least one of a steering angle acceleration coefficient C based on a steering torque and the steering angle acceleration gain

Kdd in the steering angle acceleration term if the hands-off state is indicated that is different from the value used in the steering angle acceleration term if the hands-on state is indicated.

5. (Previously presented) The steering control device of claim 1, further comprising:

a steering angle velocity detection sensor configured to generate a signal indicative of the steering angle velocity; and wherein the steering angle velocity term comprises $B*Kd*d\theta/dt$ and the controller is configured to reduce the steering reaction force if the hands-off state is indicated by using the value of least one of a steering angle velocity coefficient B based on a steering torque and the steering angle velocity gain Kd in the steering angle velocity term if the hands-off state is indicated that is different from the value used in the steering angle velocity term if the hands-on state is indicated.

6. (Previously presented) The steering control device of claim 1, further comprising:

a steering torque detection sensor configured to generate a signal indicative of steering torque; and wherein the value of the at least one of the coefficient and the gain is based on the steering torque.

7. (Previously presented) A vehicle having road wheels, comprising:

a steering unit;

an electronically-controlled turning unit responsive to the steering unit that turns the road wheels based on a position of the steering unit;

a steering reaction force applicator configured for applying a steering reaction force to the steering unit, the steering reaction force responsive to a control signal having a value equal to a summation of a plurality of terms, the plurality of terms including at least a steering angle term $Kp*\theta$, a steering angle velocity term $Kd*d\theta/dt$ and a steering angle acceleration term $Kdd*d^2\theta/dt^2$; wherein θ is a steering angle of the steering unit, Kp is a steering angle gain dependent on the steering angle such that the steering angle gain is non-zero when the steering angle is non-zero and dependent on vehicle speed such that an

absolute value of the steering angle gain is higher at a first vehicle speed than at a second vehicle speed lower than the first vehicle speed, Kd is a steering angle velocity gain dependent on a steering angle velocity such that the steering angle velocity gain is non-zero when the steering angle velocity is non-zero and dependent on the vehicle speed such that an absolute value of the steering angle velocity gain is higher at the first vehicle speed than at the second vehicle speed, and Kdd is a steering angle acceleration gain dependent on a steering angle acceleration such that the steering angle acceleration gain is non-zero when the steering angle acceleration is non-zero and dependent on the vehicle speed such that an absolute value of the steering angle acceleration gain is higher at the first vehicle speed than at the second vehicle speed;

a hands-free sensor configured for detecting whether the steering unit is in a hands-off state or in a hands-on state; and

a steering reaction force correction component configured for reducing the steering reaction force applied if the hands-off state is detected relative to the steering reaction force applied if the hands-on state is detected by using a value of at least one of a coefficient and a gain for at least one of the plurality of terms in the summation if the hands-off state is detected that is different from a value used if the hands-on state is detected.

8. (Previously presented) The vehicle of claim 7, further comprising:

a road surface reaction force sensor configured for detecting a road surface reaction force F, the plurality of terms including a road surface reaction force term D*Kf*F; and wherein the steering reaction force correction component reduces the steering reaction force if the steering unit is in the hands-off state by using a value of least one of a road surface reaction force gain Kf and a road surface reaction force coefficient D in the road surface reaction force term if the hands-off state is detected that is different from the value used in the road surface reaction force term if the hands-on state is detected; and wherein the road surface reaction force gain is dependent on the read surface reaction force such that the road surface reaction force gain is non-zero when the road surface reaction force is non-zero and dependent on vehicle speed such that an absolute value of the road surface reaction force gain is higher at the first vehicle speed than at the second vehicle speed.

9. (Previously presented) The vehicle of claim 7, further comprising:

a steering angle detection sensor for detecting the steering angle; and wherein the steering angle term comprises $A*Kp*\theta$ and the steering reaction force correction component reduces the steering reaction force if the hands-off state is detected by using the value of least one of a steering angle coefficient A based on a steering torque and the steering angle gain in the steering angle term if the hands-off state is detected that is different from the value used in the steering angle term if the hands-on state is detected.

10. (Previously presented) The vehicle of claim 7, further comprising:

a steering angle acceleration detection sensor for detecting the steering angle acceleration; and wherein the steering angle acceleration term comprises $C*Kdd*d^2\theta/dt^2$ and the steering reaction force correction component reduces the steering reaction force if the hands-off state is detected by using the value of least one of a steering angle acceleration coefficient C based on a steering torque and the steering angle acceleration gain in the steering angle acceleration term if the hands-off state is detected that is different from the value used in the steering angle acceleration term if the hands-on state is detected.

11. (Previously presented) The vehicle of claim 7, further comprising:

a steering angle velocity detection sensor for detecting the steering angle velocity; and wherein the steering angle velocity term comprises $B*Kd*d\theta/dt$ and the steering reaction force correction component reduces the steering reaction force if the hands-off state is detected by using the value of least one of a steering angle velocity coefficient B based on a steering torque and the steering angle velocity gain in the steering angle velocity term if the hands-off state is detected that is different from the value used in the steering angle velocity term if the hands-on state is detected.

12. (Previously presented) The vehicle of claim 7, further comprising:

a steering torque detection sensor for detecting steering torque; wherein the value of the at least one of the coefficient and the gain is based on the steering torque.

13. (Previously presented) A device for controlling road wheels of a vehicle comprising:

means for turning the road wheels in response to a steering input of a steering unit;

means for applying a steering reaction force to the steering unit, the steering reaction force responsive to a control signal having a value equal to a summation of a plurality of terms, the plurality of terms including at least a steering angle term $Kp*\theta$, a steering angle velocity term $Kd*d\theta/dt$ and a steering angle acceleration term $Kdd*d^2\theta/dt^2$; wherein θ is a steering angle of the steering unit, Kp is a steering angle gain, Kd is a steering angle velocity gain and Kdd is a steering angle acceleration gain;

means for detecting whether the steering unit is in a hands-on or in a hands-off state; and

means for reducing the steering reaction force from that in the hands-on state if the hands-off state is detected by using a value of at least one of a coefficient and a gain for at least one of the plurality of terms in the summation if the hands-off state is detected that is different from a value used in the hands-on state.

14. (Previously presented) A method for controlling the road wheels of a vehicle comprising:

turning the road wheels from a steering input via a steering unit;

applying a steering reaction force to the steering unit, the steering reaction force responsive to a control signal having a value equal to a summation of a plurality of terms, the plurality of terms including at least a steering angle term $Kp*\theta$, a steering angle velocity term $Kd*d\theta/dt$ and a steering angle acceleration term $Kdd*d^2\theta/dt^2$; wherein θ is a steering angle of the steering unit, Kp is a steering angle gain dependent on the steering angle such that the steering angle gain is non-zero when the steering angle is non-zero and dependent on vehicle speed such that an absolute value of the steering angle gain is higher at a first vehicle speed than at a second vehicle speed lower than the first vehicle speed, Kd is a steering angle velocity gain dependent on a steering angle velocity such that the steering

angle velocity gain is non-zero when the steering angle velocity is non-zero and dependent on the vehicle speed such that an absolute value of the steering angle velocity gain is higher at the first vehicle speed than at the second vehicle speed, and Kdd is a steering angle acceleration gain dependent on a steering angle acceleration such that the steering angle acceleration gain is non-zero when the steering angle acceleration is non-zero and dependent on the vehicle speed such that an absolute value of the steering angle acceleration gain is higher at the first vehicle speed than at the second vehicle speed;

detecting whether the steering unit is in a hands-on or in the hands-off state; and

reducing the steering reaction force applied if the hands-off state is detected relative to the steering reaction force applied if the hands-on state is detected by using a value of at least one of a coefficient and a gain for at least one of the plurality of terms in the summation if the hands-off state is detected that is different from a value used if the hands-on state is detected.

15. (Previously presented) The method of claim 14, further comprising;

detecting a road surface reaction force F, wherein the plurality of terms includes a road surface reaction force term D*Kf*F and

reducing the steering reaction force if the hands-off state is detected by using a value of least one of a road surface reaction force gain Kf and a road surface reaction force coefficient D in the road surface reaction force term if the hands-off state is detected that is different from the value used in the road surface reaction force term if the hands-on state is detected; and wherein the road surface reaction force gain is dependent on the read surface reaction force such that the road surface reaction force gain is non-zero when the road surface reaction force is non-zero and dependent on vehicle speed such that an absolute value of the road surface reaction force gain is higher at the first vehicle speed than at the second vehicle speed.

16. (Previously presented) The method of claim 14, wherein the steering angle term comprises A*Kp*θ and further comprising:

detecting the steering angle; and

reducing the steering reaction force if the hands-off state is detected by using the value of least one of a steering angle coefficient A based on a steering torque and the steering angle gain in the steering angle term if the hands-off state is detected that is different from the value used in the steering angle term if the hands-on state is detected.

17. (Previously presented) The method of claim 14, wherein the steering angle acceleration term comprises $C*Kdd*d^2\theta/dt^2$ and further comprising:

detecting the steering angle acceleration; and

reducing the steering reaction force if the hands-off state is detected by using the value of least one of a steering angle acceleration coefficient C based on a steering torque and the steering angle acceleration gain in the steering angle acceleration term if the hands-off state is detected that is different from the value used in the steering angle acceleration term if the hands-on state is detected.

18. (Previously presented) The method of claim 14, wherein the steering angle velocity term comprises $B*Kd*d\theta/dt$ and further comprising:

detecting the steering angle velocity; and

reducing the steering reaction force if the hands-off state is detected by using the value of least one of a steering angle velocity coefficient B based on a steering torque and the steering angle velocity gain in the steering angle velocity term if the hands-off state is detected that is different from the value used in the steering angle velocity term if the hands-on state is detected.

19. (Previously presented) The method of claim 14, further comprising:

detecting a steering torque; wherein the value of the at least one of the coefficient and the gain is based on the steering torque.

20. (Previously presented) The steering control device of claim 1 wherein the steering angle term includes a steering angle coefficient A, the steering angle velocity

term includes a steering angle velocity coefficient B and the steering angle acceleration term includes a steering angle acceleration coefficient C; and wherein a value for each of the steering angle coefficient A, the steering angle velocity coefficient B and the steering angle acceleration coefficient C depends on steering torque.

21. (Previously presented) The steering control device of claim 1, further comprising:

a road surface reaction force sensor configured to generate a signal indicative of a road surface reaction force F, the plurality of terms including a road surface reaction force term Kf*F; and wherein Kf is a road surface reaction force gain dependent on the read surface reaction force such that the road surface reaction force gain is non-zero when the road surface reaction force is non-zero and dependent on vehicle speed such that an absolute value of the road surface reaction force gain is higher at the first vehicle speed than at the second vehicle speed.

22. (Previously presented) The vehicle of claim 7, further comprising:

at least one of a steering angle coefficient A in the steering angle term, a steering angle velocity coefficient B in the steering angle velocity term and a steering angle acceleration coefficient C in the steering angle acceleration term.

23. (Previously presented) The vehicle of claim 7 wherein the plurality of terms further comprises a road surface reaction force term Kf*F wherein F is a road surface reaction force and Kf is a road surface reaction force gain dependent on the read surface reaction force such that the road surface reaction force gain is non-zero when the road surface reaction force is non-zero and dependent on vehicle speed such that an absolute value of the road surface reaction force gain is higher at the first vehicle speed than at the second vehicle speed.

24. (Previously presented) The method of claim 14 wherein the plurality of terms further comprises a road surface reaction force term Kf*F wherein F is a road surface

reaction force and Kf is a road surface reaction force gain dependent on the read surface reaction force such that the road surface reaction force gain is non-zero when the road surface reaction force is non-zero and dependent on vehicle speed such that an absolute value of the road surface reaction force gain is higher at the first vehicle speed than at the second vehicle speed.

25. (Previously presented) The method of claim 24 wherein the steering angle term includes a steering angle coefficient A, the steering angle velocity term includes a steering angle velocity coefficient B, the steering angle acceleration term includes a steering angle acceleration coefficient C and the road surface reaction force term includes a road surface reaction force coefficient D; and wherein a value for each coefficient depends on steering torque.